**CZAKI THERMO-PRODUCT**
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# PROGRAMMABLE RAIL-MOUNT TRANSMITTER

## TED series




- ☐ output signal 4 ... 20 mA (**TED-27**, **TED-28**)
  0 ... 10 V (**TED-37**, **TED-38**)
- ☐ **input - output galvanic insulation** (**TED-28**, **TED-38**)
- ☐ programmable input signal range
- ☐ programmable sensor type: Pt100, Ni100, J, K, N, S, R, B, T
- ☐ RTD sensor can be connected in 2, 3 or 4-wire system
- ☐ internal or external compensation of thermocouple cold junction
- ☐ sensor failure indication by LED
- ☐ for mounting on 35 mm wide rail, according to DIN EN 50022-35

The transmitter TED is designed to converting resistance of temperature sensor or voltage of thermocouple sensor to standard current signal 4...20 mA (TED-27, TED-28) or voltage 0...10V (TED-37, TED-38).
Transmitters TED-28 and TED-38 provide galvanic insulation between input and output terminals.
Most parameters such as: sensor type, input signal range or mode of cold junction compensation, may be adapted by user for specific requirements of his measuring system.
The transmitter is programmed using a personal computer with USB port via **IF-2013U** interface which is also offered.
The housing is designed for mounting on 35 mm wide rail, according to DIN EN 50022-35.

## TECHNICAL DATA

| | | |
|---|---|---|
| Sensor type, measuring range | | programmable, see Table 1 |
| Maximum range, accuracy, thermal drift | | see Table 1 |
| Pt100 or Ni100 sensor connection | | 2, 3 or 4-wire, programmable |
| Pt100 or Ni100 connection resistance (2 and 3-wire) | | $<$10 Ω (each wire) |
| Maximum resistance for 2-wire connection which can be corrected with software | | 0,00 ...20,00 Ω (sum of both wires) |
| Bias current of Pt100 or Ni100 sensors | | $<$ 0,25mA |
| Compensation of thermocouple cold junction | | internal or external, programmable |
| Maximum error of thermocouple cold junction internal compensation | | ±1 °C |
| Temperature range of thermocouple cold junction external compensation | | -50,0 ... 100,0 °C |
| Range of temperature offset | | -10,0 ... 10,0 °C |
| Galvanic insulation between input and output terminals (TED-28 and TED-38) | | 500 V AC |
| Output signal | TED-2x | 4 ... 20 mA or 20 ... 4 mA, programmable |
| | TED-3x | 0 ... 10 V or 10 ... 0 V, programmable |
| Linear region of output signal | TED-2x | 3,8 ... 20,5 mA |
| | TED-3x | 0,0 ... 10,3 V |
| Output signal delay after power on | | ca. 5 s |
| Digital filter time constant (1st order filter)) | | selected: 0,2; 1; 2; 4; 8; 16; 32 s |
| Sensor failure indication | TED-2x | 3,5 or 23 mA, programmable |
| | TED-3x | 0 or 11,5 V, programmablea |
| Power supply | TED-2x | 8 ... 36 V DC / 24 mA (from current loop) |
| | TED-3x | 14 ... 36 V DC / 18 mA |
| Ambient temperature | | 0 ... +60 °C |
| Dimensions (height x width x depth) / weight | | 98 x 17,5 x 56,4 mm / ca. 50 g |

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**Table 1.** Summary of sensor types, input signal ranges and accuracy.

| Sensor type | Measuring range [°C] | Minimal measuring range [°C] (1) | Accuracy- largest value (2),(3) | Thermal drift / 10°C - largest value (2),(4) |
|---|---|---|---|---|
| **B** PtRh30-PtRh6 | 400 ... 1800 | 200 | 0,2% or ±5°C | 0,07% or ±1,5°C |
| **J** Fe-CuNi | -100 ... 1000 | 50 | 0,2% lor ±1°C | 0,07% or ±0,7°C |
| **K** NiCr-NiAl | -100 ... 1200 | 50 | | |
| **N** NiCrSi-NiSi | -100 ... 1300 | 100 | | |
| **R** PtRh13-Pt | 0 ... 1600 | 200 | 0,2% or ±2°C | 0,07% lor ±1,5°C |
| **S** PtRh10-Pt | 0 ... 1600 | 200 | | |
| **T** Cu-CuNi | -100 ... 400 | 50 | 0,2% or ±1°C | 0,07% or ±0,7°C |
| **Pt100** | -100 ... 800 | 30 | 0,15% or ±0,2°C | 0,05% or ±0,1°C |
| **Ni100** | -60 ... 180 | 30 | | |
| Voltage [mV] | -10 ... 65 mV | 2 mV | 0,2% or ±0,05mV | 0,07% or ±0,03mV |
| Resistance [Ω] | 60 ... 370 Ω | 20 Ω | 0,15% or ±0,1 Ω | 0,05% or ±0,05 Ω |

(1) Minimum difference between upper and lower range value.
(2) Error values in [%] are relative to user-defined range.
(3) The ambient temperature = 23 °C.
(4) Thermal drift means that the error may change with the ambient temperature.

## ORDERING CODE

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| **TED** | — | — | — | — | — | — | — | — |

| | | |
|---|---|---|
| **(1)** | Model of transmitter | **27** output 4 ... 20 mA, without insulation<br>**37** output 0 ... 10 V, without insulation<br>**28** output 4 ... 20 mA, with insulation<br>**38** output 0 ... 10 V, with insulation |
| **(2)** | Sensor type | **Pt100**, **Ni100**, **J**, **K**, **N**, **S**, **R**, **T**, **mV**, **Ohm** |
| **(3)** | Lower range value | value in [°C], [mV] or [Ω] (default lowest value for selected sensor type) |
| **(4)** | Upper range value | value in [°C], [mV] or [Ω] (default highest value for selected sensor type) |
| **(5)** | Connecting Pt100, Ni100 or thermocouple cold junction compensation | **2**(...)(*), **3**, **4** - wires<br>**I** - internal (automatic), **E**(...)(**) - external (user defined) |
| **(6)** | Converting characteristic | **N** - normal (4 ...20 mA, 0 ... 10 V), **R -** reverse (20 ... 4 mA, 10 ... 0 V) |
| **(7)** | Time constant of digital filter [s], selected | **0**, **1**, **2**, **4**, **8**, **16**, **32** (0 really means 0,2 s) |
| **(8)** | Alarm output signal | **H** - high level (23 mA or 11,5 V), **L** - low level (3,5 mA or 0 V) |

(*) Sum of resistances of wires can be given in brackets.
(**) Thermocouple cold junction temperature must be given in brackets.

Default values were marked by under-scoring. Factory programmed in case of incomplete ordering code.
The specification of the model, i.e. point (1) is compulsory.

**Example for order:** TED-27-Pt100-0-150-2(0,8)-N-2-L denotes Pt100 temperature transmitter for range 0 ... 150°C with 4 ... 20 mA signal output. The sensor is connected with two wires (sum of resistances of wires = 0,8 Ω); time constant = 0.5 s; in the case of sensor failure, output current is 3,5 mA.

TED-38-K-0-600-I-N-1-H denotes thermocouple K temperature transmitter for range 0 ... 600 °C with 0 ...10V signal output galvanically insulated from sensor. Internal cold junction compensation; time constant = 1 s; in the case of sensor failure, output voltage is 11,5 V.